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BRAIN SURGERY.

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AMONG the many wonderful advances made in medical science during the present half of the nineteenth century that of the successful performance of surgical operations on the human brain may properly be accorded a prominent place in the front rank, and it must also be borne in mind that that rank embraces anæsthesia, antisepsis and the germ theory of the cause and cure of disease. Any one of these is sufficient of itself to mark an era in the progress of the science and art of medicine.

Within the memory of surgeons of the present generation the idea of attempting in cold blood a surgical operation on the brain would have been reprobated as utterly unjustifiable, and as logically entitling the perpetrator either to incarceration within the walls of a lunatic asylum or those of a prison. The organ was looked upon as something almost sacred, and as not to be touched by the profane knife of the surgeon. It was regarded as being the seat not only of the mind but of the soul, and he who should have dared to desecrate this temple of the immortal essence would have had to endure the vituperation not only of those of his own profession—of whom there are always many—who stand in the way of progress, but of still more narrow-minded and unprogressive theologians.

It is not to be forgotten that some of these latter when anæsthesia was introduced into obstetrical practice thundered their anathemas from the pulpit and the press against the wicked physicians who were, as they declared, defying the Almighty, and trying to set aside the curse pronounced against Eve—"In sorrow shalt thou bring forth all the days of thy life." And to our shame we must admit that there were physicians in those days who entertained the belief that it was good for a woman that she should suffer at such times. Happily the spirit of the age is different now, and though there still exists, and will exist till the end of the world, jealousy and ultra-conservatism in the one profession, and mental stagnation and ignorance of science in the other, the skilful, the conscientious and the bold investigator can generally manage to hold his own against all attacks whether they come from within or without.

Again, extremely exalted ideas in regard to the delicacy of the structure of the brain conjoined with the intricacy of the arrangements of its several parts, and very considerable ignorance of their functions, have tended to make surgeons exceedingly cautious, not to say terrorized, at the idea of invading its precincts even in the slightest degree. Experiments which accidents made for them did not seem to create much of an impression. Thus, persons have had their skulls fractured and have lost several tablespoonfuls of brain matter and yet have recovered. Others have had fragments of the skull driven into the brain by violence, and they have remained there, causing no subsequent inconvenience, and still others have been shot in the head and the bullets have remained encysted in the brain, while the injured person continued to go about his business with as much intelligence as he had before the wound.

Not very many years ago a strong, healthy man twenty-five years of age was engaged in ramming down a charge of powder in a rock to be blasted when an explosion took place and the tamping iron was driven through his head from the base of his skull to the vertex. In a few minutes he recovered his consciousness, was put into a cart and carried three-quarters of a mile to his residence where he got out and walked into the house. Two hours afterwards he was seen by a physician ; he was then quite conscious and collected in his mind, but exhausted by an extensive hemorrhage from the hole in the top of his head. But the wound finally closed up and his recovery was complete. There was no pain in the head, but he experienced a queer feeling which he could not describe. As regards his mind he was fitful and vacillating, though obstinate as he had always been. He became very profane, never having been so before the accident. He lived twelve and a half years after the accident, and his cranium with the bar that went through it are now in the Warren Anatomical Museum at Boston. An examination shows that the left anterior lobe of the brain had suffered severely by this terrible injury, and yet the derangement of the mental and bodily faculties was certainly not in proportion to the extensive loss of brain substance that had been suffered.

And this case is equalled if not excelled by another, and the subject of this injury is so, far as I know, still alive. In this instance a healthy and intelligent man about twenty-seven years of age was blasting coal when the charge exploded unexpectedly and an iron gas pipe that he was using was driven transversely through his head, entering just above the right eye and emerging on the opposite side near the middle of the skull. One of his fellow-miners saw him on his hands and knees struggling as if to rise. In going to the man's assistance, he placed his knee upon his chest, supported his head with one hand, and with the other withdrew the pipe. This last projected about equally on each side of the head, and much force was required for its withdrawal. Brain escaped from the anterior opening and coma and collapse supervened. In seven weeks he sat up and in one more walked about. There was no paralysis anywhere, but the movements of his right hand were somewhat impaired. Nearly a year after the accident his memory for some things was almost lost, but during the next two months there was considerable improvement.

The accident happened on May 14, 1867, and in June, 1868, the patient with the gas pipe was exhibited in the Massachusetts Medical Society. Dr. Jackson stated at the time that the man appeared to be in a good state of general health, and though his mental powers were considerably impaired there was nothing unusual in his expression nor would there be noticed, in a few minutes' conversation with him, any marked deficiency of intellect.

Such unintentional surgical operations as these, and many other similar ones, ought not to have been disregarded, and yet they seem to have created no other emotion than that of astonishment that, notwithstanding the terrible injuries inflicted on the brain, the subjects continued to live in comparatively good mental and physical health. Even after the German Hitzig, the Englishman Ferrier, and other investigators in different parts of the world had mapped out the surface of the brain, explored its interior, and demonstrated the relations of its several centres to the sensory and motor functions of the body, there was a howl of indignation when that bold and scientific physician, Dr. Bartholow, touched with the electric needle the exposed brain of a patient and established for the first time on a human subject the functions of a cortical centre. Bartholow's experiment is now a common procedure in surgical operations on the brain when there is doubt as to the anatomical relations of the part upon which we are operating. We touch the point with a delicate needle connected with a very small galvanic battery and the muscles which derive their motor power from that region at once respond by contracting.

Many experiments of this character performed upon animals, especially monkeys, have given us quite accurate ideas of the position of the motor centres for various groups of muscles, and these, together with post-mortem examinations of the brains of persons who have died while suffering from impairment of a brain faculty have made us acquainted with the centres for speech, for vision, for hearing, and for other important ideational, sensory and motor functions.

As an example, take that of speech, a power that may be deranged by injury of that part of the brain called the speech tract, and which, strange to say, is located or at least developed, in perhaps nine hundred and ninety-nine persons out of a thousand, on the left side of the brain only. Disease or injury of this region produces the condition called aphasia, which is an impairment of the ability to recognize words when written or spoken, or the loss of the power to so use the muscles of speech as to articulate words even when these latter are recognized when written or spoken. The very idea of language is therefore destroyed. Sometimes such a condition is produced by an injury to the left side of the head, and then it may happen that a surgical operation leads at once to the restoration of the function.

Thus a man who was aphasic was the subject of a clinical lecture by the writer. From his friends, his own gestures and the few words he could speak, it was ascertained that several months previously he had been working in a stone quarry and was struck by some piece of the machinery on the left side of the head, immediately over that part of the brain which is considered to be the seat of the function of speech. Since that time he had been unable to speak more than a few words, though he could pronounce a word that was spoken to him, forgetting it again, however, almost as soon as it was uttered. Thus when asked where he was born he became much excited, gesticulated violently and apparently made every effort to answer. The perspiration stood out in large drops on his forehead, but no sound came from his lips. Then the following conversation took place: "Were you born in Prussia?" "No." "In Bavaria?" "No." "In Austria?" "No." "In Switzerland?" "Yes, yes, yes—Switzerland, Switzerland," at the same time laughing and moving his hands actively in all directions. He could pronounce words well, but could not write.

The man was a patient in Bellevue Hospital and the writer advised that he be trephined with a view of elevating any depressed piece of bone that might be pressing upon the brain and preventing the exercise of its normal function. The operation was performed a few days afterwards, the patient being placed under the influence of ether. The internal table of the skull was found to be fractured and a splinter of bone was pressing upon a portion of the speech tract. This was removed and as soon as the patient emerged from the anæsthetic condition he spoke perfectly well.

Not long ago a little girl some three or four years of age was under the writer's care for epilepsy and a loss of the power of speech. She had spoken as well as most children up to the age of two years, when she had fallen from her nurse's arms, striking the left side of her head with a good deal of force against the floor. Immediately afterwards convulsions ensued, and were of frequent occurrence up to the time of her coming under observation. With the supervention of the spasms speech became more imperfect, and in a month or two was entirely lost. In other respects the child was sufficiently intelligent, and there was no paralysis anywhere. The case was considered to be one favorable for an operation, and it was accordingly performed by the writer. No fracture of the skull was found, but the skull was strongly adherent to the membranes of the brain at that part, and it required some force to remove the button of bone separated by the trephine. A probe was passed between the brain and the skull and the adhesions broken up. The convulsions gradually ceased, and in a few weeks the child began to utter some words. A year afterwards the mother wrote that there were no longer any spasms and that the child talked so much that her uncle jokingly remarked that it might be well to send her back and have the bone replaced, for that it was better to have a girl that didn't talk at all than to have one that talked all the time.

Much more severe operations than these are now successfully performed upon the brain. Tumors that would otherwise surely cause the death of the patient are now removed and life and reason preserved. Our knowledge of the anatomy and physiology of the brain enables us to locate these and other diseased conditions with precision, and though it is true that many of the subjects of these operations die, yet it must be borne in mind that death would be the inevitable result in all of them if surgical interference were neglected. If, therefore, we succeed in saving a small proportion of such cases, humanity is the gainer.

There is a form of cranial injury in which surgical aid is especially beneficial and in which by prompt action life may frequently be saved. A man falls down an area, for instance, striking his head on the hard surface below. He is stunned for a few minutes and then partially recovers consciousness, which, however, is gradually lost and profound stupor sets in. In such an instance there is probably the rupture of a blood vessel in the membranes of the brain between this organ and the skull and blood is effused, which, by its pressure on the brain, produces stupor and eventually death. Such cases were until within the last few years invariably fatal, and even now, such is the usual result, for comparatively few surgeons know what great advances have recently been made in the science and art of brain surgery. Only a few weeks ago a case of the kind occurred in Washington City in which a man was passively allowed to die when in all probability his life could have been saved by an operation. And this operation is a very simple one. We ascertain from an inspection of the seat of injury on what part of the skull the blow has been received, and we are further strengthened in our search for evidence by the symptoms exhibited by the patient. We trephine the skull at the injured point and let out the blood that has been extravasated. As soon as the pressure is relieved consciousness is regained and the patient lives.

Quite recently operations have been performed upon the skull in cases of idiocy innate or acquired, with the view of removing a supposed disproportion between the size of the brain and the skull, and thus allowing the organ space in which to grow. A French surgeon proposed the removal of strips of the cranium in cases of idiocy in which the skull was unduly small, and in which as he supposed there was no room tor the brain to expand. Several of his cases and those performed according to his method by other surgeons have been in a measure successful, so that there is decided encouragement to persevere with the operation in instances in which it appears to be suitable. Several years before the pubication of his results the writer had performed similar operations for the cure of epilepsy, and in a few cases with complete success.

About a year ago a very interesting case came under his care, being that of a young man who, little by little, passed from a condition of good mental development to one of well-marked imbecility. On each side of the forehead two buttons of bone, the distance of two inches from each other, were removed by the trephine and the intervening bone was then cut away by an instrument especially adapted for the purpose. There was thus on each side of his skull an opening over three inches long and a little more than half an inch wide. He at once began to improve in his mind and in a few days after the performance of the operation he became able to carry on a conversation and even to write letters. He returned home some six weeks after the operation and in a letter received from his father last summer it is stated that his mind has continued to develop and that he is re-acquiring the knowledge of the French language, which he had possessed previous to his illness.

Cases such as these give us reason for believing that with an increased knowledge of the functions of the brain—and there is much yet for us to learn in this regard—and with improved methods of procedure the field of surgical operations on this preëminent organ of the body will be still further enlarged, and the cases that even now seem to be beyond the reach of our art will, as has been the case with so many other apparently hopeless diseases, be added to the triumphs which scientific medicine and surgery are continually achieving.

Antiseptic measures and strict attention to cleanliness and nursing have wonderfully aided in securing the many brilliant results in brain surgery which the trephine and the knife have yielded us. Now, the event most to be feared is not so much the immediate operation as it is the subsequent inflammation and suppuration resulting from the necessary manipulation and the exposure to the atmosphere. This danger is at the present time reduced to a minimum. The skull is opened, the membranes are divided, the brain itself is explored with probes and knives, an abscess is evacuated, a clot of blood removed, a tumor excised, and the subjects of all these bold and terrible procedures suffer no pain and recover without the formation of a single drop of pus.

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